



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
HEADQUARTERS
SPACE TECHNOLOGY MISSION DIRECTORATE
300 E Street, SW
Washington, DC 2054-0001

**NASA EARLY CAREER INITIATIVE (ECI)
FY23 SOLICITATION**

Solicitation Issued: March 1, 2022
Center Proposals Due to STMD: June 30, 2022 (5PM ET)

*Engaging NASA early career researchers with world class partners to
develop the innovative leaders and technologies of the future*

Key Information

As an element of the NASA Center Innovation Fund Program, the Early Career Initiative (ECI) provides the opportunity for NASA's early career workforce to propose and develop innovative aerospace technology projects, engage with leading industry and academic partners, and develop the skills required to manage and transition transformative concepts into future NASA missions.

Eligibility: All NASA early career civil servants (typically defined as service within 10 years following completion of terminal degree) are eligible to serve as an ECI Principal Investigator or early career team member. Early career on-site contractors are not eligible to lead or submit ECI proposals but may participate as ECI team members. As an FFRDC, the Jet Propulsion Laboratory is not eligible to submit proposals but may participate as team members.

Key Dates:

- Call for Proposals Released: March 1, 2022
- Proposer's Virtual Forum: March 25, 2022, 12:00-2:00PM ET (ECI Teams)
- Additional Q&A Sessions: April 21, May 19, June 14; 1:00-2:00PM ET (ECI Teams)
(Frequently Asked Questions will be updated and posted on ECI Teams)
- Proposals Due: June 30, 2022, 5:00PM ET
- Selection Notification: August 21, 2022 (Target)
- Project Start Date: October 1, 2022

Proposal Submission and Review Process: Proposal content shall conform to the guidance provided in this solicitation. Proposals shall be submitted to the Center Chief Technologist per the process established at each Center. For FY23, no more than two (2) proposals may be submitted by each lead Center to STMD for review; however, Centers may partner on multiple proposals without restriction.

Starting Technology Readiness Level (TRL): Typically \leq TRL-3 at the start of award, but later development stages may be considered.

Award Details:

- Award Duration: Two years
- Maximum Award Amount: \$2.5M (\$1.25M per year)
- Expected Number of FY23 Awards: Up to 5 awards, pending budget availability

Selection Official: Final ECI award selections will be made by the STMD Deputy Associate Administrator for Programs or designee.

STMD Point of Contact:

Michael LaPointe, PhD
NASA CIF/ECI Program Executive
Space Technology Mission Directorate, NASA Headquarters
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NASA Early Career Initiative

1.0 Introduction

Engaging the brightest minds from government, industry and academia, the NASA Space Technology Mission Directorate (STMD) develops innovative technology solutions to address the Nation's toughest aerospace challenges. As a key element of the STMD Center Innovation Fund Program, the Early Career Initiative (ECI) provides an opportunity for NASA early career professionals to engage with leading industry, academic and government partners to develop new and revolutionary advanced technologies, and to develop the skills needed to manage and transition these transformative concepts into future NASA missions.

Technologies proposed to this solicitation should map to one or more of the NASA Taxonomy Areas (Appendix A). Proposals are encouraged, but not restricted, to address capabilities supporting the STMD Strategic Focus Areas (Appendix B). In addition, proposers may also submit technology projects that address national goals in climate related technology areas, as further described in Appendix C. Proposers are encouraged to consult with the appropriate STMD technical points of contact listed in these Appendices regarding state-of-the-art, on-going activities and investments, and strategic needs in their respective technology areas.

2.0 Funding and Award Information

For FY23, ECI anticipates awarding up to 5 (five) new awards to begin October 1, 2022, pending the availability of program funds. Each project will receive up to \$1.25M in annual funding (procurement, labor and travel) each year for a period of 2-years. Although \$2.5M is the maximum allowable project lifecycle cost, proposals requesting less than the maximum amount may enable additional selections.

Restrictions on number of proposals submitted per Center	No more than two (2) proposals may be submitted by each lead Center; however, Centers may partner on multiple proposals without restriction.
Anticipated number of FY23 Awards	STMD anticipates making up to 5 (five) new awards to start on October 1, 2022, pending available ECI Program budget and proposed costs.
Project duration	Awards will be funded for a period of 24 months
Funding	Projects will receive a maximum of \$1.25M per year to include labor, procurement, and travel (maximum life cycle cost of \$2.5M over 2 years)

2.1 Deliverables and Reporting Requirements

ECI Principal Investigators are required to meet the following program deliverables:

- Attend a virtual half-day ECI Orientation meeting, to be held in early September 2022.
- Submit monthly quad charts following a program-defined template. The quad charts will detail recent project accomplishments, upcoming significant events, and issues and concerns, and will be used to inform STMD monthly program reviews.

- Participate in a virtual half-day status review with ECI Program personnel approximately 6 months after project start.
- Attend an annual project continuation review. All ECI PIs are required to participate in the annual review, to be held at NASA HQ in Washington, D.C. The purpose of the review for first year projects is to evaluate overall performance during the prior year and ensure adequate progress toward meeting project goals and objectives. The annual review will serve as a final review for projects completing their second year. This 2-day meeting will occur in September each year.
- A final written report is required within 60 days of project completion. The final report will generally follow a program-defined template and should be suitable for public release. The report will detail project goals and objectives, anticipated benefits to NASA, major accomplishments and findings, and plans for advancing the technology beyond ECI. A corresponding spreadsheet will be provided for the PI to populate with information required for the NASA TechPort and internal NASA SPAR databases.

In addition to required meetings, informal tag ups between the PIs and STMD Program Executive will occur as needed to assess progress and address issues that may be encountered during the performance of the project.

3.0 Eligibility

This ECI call is open to all NASA civil servants that satisfy the requirements of an early career professional, typically defined as within the first 10 years of an individual's early career (i. e. entry level professional).¹ Any alternative Center definitions of an early career employee must be confirmed with the NASA Program Executive to ensure equal opportunities exist across all Centers. Early career civil servants at any of the NASA Field Centers may serve as a Principal Investigator or participate as an early career team member. Employees of the NASA Jet Propulsion Laboratory are not eligible to serve as Principal Investigators or to submit proposals in response to this call but may participate as ECI team members. Similarly, on-site contractors are not eligible to lead or submit ECI proposals but may participate as ECI team members.

3.1 Team Members

3.1.1 Early Career Principal Investigators

ECI projects are led by Principal Investigators (PIs), who must be NASA early career civil servants at the time of award. Only one PI is allowed per project; co-PIs are not allowed. PIs are encouraged to commit full time to the project over the 2-year lifecycle; a minimum time allocation of 75% is required.

3.1.2 Early Career Project Managers

Projects may include early career Project Managers (PMs) to assist the PI with project execution. PMs are encouraged to commit a majority of their time to the project over the 2-year lifecycle; a minimum time allocation of 50% is required.

¹ This definition is used to define eligibility for the NASA Early Career Achievement Medal

3.1.3 Early Career Team Members

The ECI program provides an opportunity for NASA early career professionals to participate in a high visibility technology development project. Core ECI team members bring different areas of expertise to the project and should be chosen for their relevant skills and the opportunity for career development. While there is no limit on the number of core team members allowed, early career team members should commit an amount of time commensurate with their project roles and career development goals. Early career personnel at other NASA Centers and JPL, as well as early career on-site contractors, may participate as core team members.

3.1.4 Senior Team Members

While the goal of the ECI program is to foster the development of NASA early career civil servants, it is recognized that the project may benefit from the participation of more experienced team personnel. The funded participation of more senior career civil servants and on-site contractor personnel from any NASA Center or JPL is allowed; however, NASA early career civil servants should constitute the majority of team members and fill key project leadership and technology development roles.

3.1.5 Project Mentors

Each project must include one or more experienced NASA mentors, who can support the technology development, project management, and workforce development elements of the project. For example, a team may wish to engage both an experienced project manager who can help provide context between standard NASA practices and the selected program management approach, and a senior scientist or engineer who can provide guidance on technical aspects of the project.

3.1.6 External Partners

Each ECI project must engage with a highly qualified external partner that brings an element of technical, management or programmatic experience or innovation to the project. The participation of the external partner should be an integral part of the project. Multiple external partners are allowed, but their roles must be substantive and clearly justified. The external partner cannot be another NASA Center or JPL, but as previously noted, proposers are welcome to team with other Centers or JPL in addition to the external partner.

Funding for an external partner should be included in the proposed ECI budget, and procurement funds for the partner organization will be distributed by HQ to the selected NASA Centers for award. Partner organization costs are expected to range between 25% to 45% of the total ECI budget, commensurate with the proposed partner roles. Cost sharing with external partners is encouraged but is not required.

Proposers are encouraged to engage with their Center procurement office during the proposal process to understand external partner selection requirements, determine an appropriate funding mechanism, and ensure sufficient time is available to establish a contract, grant, or other funding agreement. Establishing grants or contracts with entities outside of NASA can be a time-consuming process, often taking several months to complete after an ECI award is made. Proposers are strongly encouraged to discuss procurement requirements and processes during proposal preparation to better estimate the time it will take to engage with and fund an

external partner. These estimates should be built into your project schedule and should be part of any preliminary discussions with your external partner.

3.1.7 Foreign Entities

Foreign entities cannot serve as external partners; however, participation by a foreign organization is permitted on a no-exchange of funds basis, subject to NASA's policy on foreign participation. The participation of a foreign entity will require approval by the NASA Partnership Office prior to the generation of an Agreement (e.g., Space Act Agreement, Interagency Agreement, etc.); if foreign participation is anticipated, please ensure sufficient time in the project schedule for agreement negotiation and approval.

4.0 Proposal Submission Information

4.1 Proposal Submittal

Proposals must follow the requirements defined below and must be submitted by the Principal Investigator to their Center Chief Technologist (or designee) according to the procedures outlined at their respective NASA Centers. Center Chief Technologists may submit no more than two (2) Center-led ECI proposals in either Word or PDF format together with the corresponding project videos by the established submission date. Proposals and videos should be submitted to STMD by the Center Chief Technologist (or designee) through NASA OneDrive or Box filesharing. Alternative means of proposal submission should be approved by the CIF-ECI Program Executive prior to the submission date. Paper copies of proposals will not be accepted.

4.2 Proposal Requirements

The ECI proposal should include the following information, in the order listed. Page limits are defined for 8.5"x11" paper. Reviewers will not consider any content exceeding the page limits specified in the table below. Font style should be standard (e.g., Arial), font size should be legible (12-point for proposal text, and no less than 10-point for figure captions), line spacing should be no less than single-spaced, and margins should be reasonable (1" or greater). Single column or double column format is acceptable. Proposal appendices are not permitted and will not be reviewed.

<i>Solicitation Section</i>	<i>Proposal Section</i>	<i>Maximum Page Length</i>
4.2.1	Cover Sheet	1 page
4.2.2	Table of Contents	As needed
4.2.3	Overview Chart	1 page (landscape format; see template)
4.2.4	Technology Description and Impact	5 pages
4.2.5	Work Plan and Management Approach	5 pages
4.2.6	Team Roles and Workforce Development	As needed; ½ page per team member
4.2.7	External Partnerships	1 page per external partner

4.2.8	References and Citations	Optional (Not counted in page limit)
4.2.9	Budget Data and Justification	As needed
4.2.10	Letters of Commitment	As needed
4.2.11	Project Video (submitted separately)	N/A (3-minute max duration)

Additional information regarding the content for each proposal section is provided below.

4.2.1 Cover Sheet

The proposal should include a cover sheet that clearly identifies the title of the project, the Principal Investigator, their contact information, the submitting NASA Center, and a list of project team members, their affiliated NASA Centers, and external partner organization(s).

4.2.2 Table of Contents

A Table of Contents helps reviewers find specific proposal content. One page is preferred, but additional pages are permitted if needed.

4.2.3 Overview Chart

The proposal must include an overview chart that summarizes the proposed technology development, potential benefits, team members, management approach, and budget. The chart should follow the template provided in Appendix D and should be rotated into landscape format with legible (minimum 10 point) font size. The chart should be considered a stand-alone item, providing a high-level overview of the project that can be readily understood and referenced by reviewers. The chart should not contain any sensitive, confidential, or proprietary information.

4.2.4 Technology Description and Impact

This section should provide a compelling case for developing the proposed technology, including the technical challenges or gaps being addressed; a description of the proposed solution and a comparison with the state of the art; technical goals and objectives to be met during the project; and the potential impact it will have on future missions if successfully developed. Metrics or key performance parameters should be identified for major technology components, subsystems, or systems to demonstrate how technology advancement will be measured and how the proposed technology meets potential user/mission requirements. The proposal should identify which NASA Taxonomy Area(s) the proposed technology addresses, and the starting and anticipated ending Technology Readiness Levels should be stated. As previously noted, proposers are encouraged to consult with the appropriate STMD technical points of contact (Appendix C) or other Agency subject matter experts regarding the need and applicability of the proposed technology.

4.2.5 Work Plan and Management Approach

The proposal should include a well-defined work plan that addresses how the project will meet each of the key technical objectives. The work plan should define the analytical and experimental tasks to be accomplished, and the facilities to be used. For test facilities outside the immediate control of the proposer or proposing organization, please include a letter from the facility owner stating that the facility will be available for use in the time frame proposed. The work plan should

provide a schedule of the key tasks, reviews and milestones to be achieved over the course of the project. If applicable, a Systems Requirement Review should be included early in the project to ensure that functional and performance requirements will satisfy the proposed technical objectives.

NASA is always seeking to improve the methods used to manage advanced technology development projects. Innovative and agile management approaches, such as those used in industry or other transformational organizations and agencies, may be better suited for the management of the proposed ECI project. As such, proposers are not restricted to the tailored use of NPR 7120.8 or 7120.5 and may consider nontraditional management approaches. Proposals must clearly describe the planned management approach, and state why it is appropriate for the proposed activity. Team training in the proposed management technique may be included as part of the ECI work plan and covered as part of the proposed ECI budget.

4.2.6 Team Roles and Workforce Development

For the Principal Investigator and each early-stage core team member, provide a brief description of the member's area of expertise, their team role and key responsibilities, their time allocated to the project (as a fraction of FTE or WYE), and expectations/goals for professional development based on their assigned role. Clearly identify which team members are early career. For more senior team members, provide a description of their project role, relevant experience, and fraction of time allocated to the project. For NASA mentors, provide a brief description of their experience and engagement plan to provide technical, management, or workforce development guidance to the team. External organization personnel should be included under the External Partnerships section of the proposal (see Section 4.2.7).

It is recognized that early career personnel may not have sufficient experience to immediately begin the execution of an awarded project. Proposers are therefore encouraged to contact their Center Office of Human Resources during proposal development to identify and schedule relevant training and team building opportunities. Project funds may be used to pay for instructor led training courses and should be included as part of the proposed budget. Training will not be considered as a separate proposal evaluation criterion, but proposers are encouraged to consider potential training opportunities as proposal schedules are being developed, and to include additional training opportunities throughout the course of the project to facilitate early career workforce development.

4.2.7 External Partnerships

Each project must include a highly qualified external partner that will add technical or programmatic experience to the project. Partners may include but are not limited to academic institutions, commercial entities, and other government agencies; other NASA Centers and JPL are not considered external partners but may team on proposals. Foreign entities are not considered external partners but may participate on projects on a no-exchange of funds basis (see Section 3.1.7). Only one external partner is required, but proposals may include additional external partners as needed. Contributed in-kind or matching funds from partner organizations is encouraged but not required.

For each external partner, identify and describe the role of the external partner organization and the key personnel that will participate on the project. Describe the capabilities of the external partner organization(s), and the reason for their selection. Describe the relevant management or

technical experience of the partner personnel participating on the project. Define whether any of the external personnel are considered early career. If applicable, describe the relevant partner facilities to be used during the project.

4.2.8 References and Citations

References and citations are optional. If included, reference and citation formats should correspond to accepted publication practices used by professional societies such as the American Institute of Aeronautics and Astronautics, American Physical Society, IEEE, etc.

4.2.9 Budget Data and Justification

The proposal budget should follow the template provided in Appendix E. The proposal should include brief justifications for each major element of the project budget.

4.2.10 Letters of Commitment

Letters of commitment are required from the direct managers of each civil servant and on-site contractor team member. The letter must include an acknowledgement regarding the availability and commitment of the employee for the time specified in the proposal. Managers with more than one direct employee participating on the proposed project may submit a single letter of commitment covering employees from the same organization.

NASA Mentors are required to submit a letter of commitment acknowledging their role on the project and their anticipated time commitment. A letter from the mentor's direct supervisor is not required.

If the project includes the use of facilities or resources outside the immediate control of the ECI PI or their organization, a letter is required from the providing organization stating their commitment to provide the requested resources.

A signed letter of commitment is required from an authorized official for each external partner organization participating on the project. The letter must include an acknowledgement of the work to be performed, the period of performance, and the cost for the partner's participation.² The letter should identify specific individuals assigned to work on the project and a statement acknowledging their availability. The letter should also acknowledge the use of any partner facilities and state their availability to the project for the period specified in the proposal.

4.2.11 Project Video

Each proposal submission must be accompanied by a short 3-minute project video in MPEG4 or similar format, suitable for playback on a standard NASA issued computer. Webcam or mobile device video quality is sufficient; the intent is not to produce a studio quality video, but rather to allow the team to introduce their project in an engaging manner beyond just the written proposal. The video should (in any order):

- Introduce the team members, their affiliation, and role on the project, and identify the role of the external partner(s)

² Procurements for external partner funding may take several months to complete; please schedule accordingly

- Identify the technology being developed, the gap it addresses, and the benefits if successful
- Provide an overview of the technology development approach, including the key tasks to be accomplished
- Provide an overview of the project management approach to be used during the project, and why this approach was chosen

The videos will be reviewed by the proposal selection committee and may be used by the proposing Center or the Space Technology Mission Directorate for additional outreach and communication activities. The videos should not contain any proprietary information not suitable for public release.

4.3 NASA Flight Opportunities Program

Projects proposing to fly a payload as part of the ECI project or as a follow-on activity are encouraged to contact the NASA Flight Opportunities Program during proposal development. The Flight Opportunities Program maintains an IDIQ (Indefinite Delivery/Indefinite Quantity) contract with several U.S. suborbital providers for reusable suborbital launch vehicles, sounding rockets, parabolic flight aircraft, and high-altitude balloon flights. These suborbital testing capabilities may be used for subsystem level testing, technology risk reduction, or other project requirements. Pending available funding, the Flight Opportunities Program may pay the cost for contracted flight-testing; additional funding for flight test preparation, suborbital test hardware, and post flight analysis may also be considered. Projects are encouraged to engage with the Flight Opportunities Program early in the proposal development process to understand current capabilities and requirements; link to the NASA Flight Opportunities Program home page at: <https://www.nasa.gov/directorates/spacetech/flightopportunities/index.html>

5.0 STMD Review and Selection Process

5.1 Proposal Review and Selection

Proposals will be checked for compliance with the requirements listed in Section 4.2. Proposals deemed non-compliant will not be eligible for award. Proposals that pass compliance screening will be reviewed by the CIF-ECI Program Executive and a minimum of four additional non-advocate reviewers, which may include STMD Principal Technologists or System Capability Team Leads (based on applicable technology disciplines), representatives from STMD or other Mission Directorates, and other Agency subject matter experts as required. The reviewers will score each proposal based on the criteria outlined in Section 5.2, and an average panel score for each proposal will be determined. The review panel will discuss and rank the scored proposals and prepare a prioritized recommendation for the STMD Selecting Official. The Selecting Official will make a final selection of the ECI awards, based on the non-advocate reviews, prioritized recommendations, and considerations of programmatic balance. Proposers will be notified of selection or non-selection by the CIF-ECI Program Executive once such communication is authorized by the STMD Selection Official.

5.2 Evaluation Criteria

Reviewers will use the following evaluation criteria to score the ECI proposals:

Evaluation Criteria	Weighting
1. Technology Description and Impact	30%
a) Does the proposal identify a significant gap or need in NASA capabilities that the technology will address?	
b) Does the proposal clearly define the technology advancement and its relation to meeting identified Agency needs?	
c) Does the proposal provide clearly defined benefits to NASA and/or the national aerospace community if the technology is successfully developed?	
d) Is there a credible path beyond the ECI Program to advance or infuse the technology within or external to NASA?	
2. Work Plan and Management Approach	30%
a) Does the work plan demonstrate an understanding of the major technology development challenges, and identify specific tasks to address these challenges?	
b) Does the work plan include a well-defined schedule of key project milestones and deliverables, tied to the technology development tasks?	
c) Does the work plan lead to a clearly defined technology advancement at the end of the 2-year project? Is the end goal of the project realistic and achievable?	
d) Does the proposal clearly describe the project management approach and justify the choice of this approach?	
e) Is the requested budget adequately defined and appropriate for the proposed project? Are external partner costs reasonable and justified?	
3. Team and Workforce Development	25%
a) Does the proposal clearly define team roles, with early career personnel filling key technical and management positions?	
b) Does the team bring a diverse set of skills and capabilities to the project, and are individual skills appropriate for the assigned roles?	
c) Does the work plan provide sufficient opportunities for early career professionals to advance their skills, knowledge, and abilities through direct involvement with technical and/or management project activities?	
d) Do the NASA mentors have the required technical or project management experience to guide the early career team members? Are the planned mentor-team interactions well defined?	
e) Does the proposal clearly define the role of the external partner(s), describe the partner capabilities, and justify their participation on the project?	
4. Project Video	15%
a) Does the project video (i) introduce the team members and their roles; (ii) identify the technology being developed, the gap it	

addresses, and the benefits if successful; (iii) provide an overview of the technology development approach, including the key tasks to be accomplished; and (iv) explain the project management approach to be used during the project, and why this approach was chosen?	
b) Does the project video conform to the required time and video format (no more than 3 minutes, MPEG4 or similar format)?	
c) Is the project video engaging, and does it clearly communicate the essence of the proposed technology project for a general audience?	

5.3 Proposal Debriefings

Proposers have the right to learn the major factor(s) that led to the acceptance or rejection of any proposal. Reviewer comments will be collated, edited for clarity, and provided to unsuccessful proposers following notification. Proposers may also request a verbal debriefing from the CIF-ECI Program Executive following receipt of the reviewer comments.

6.0 Frequently Asked Questions

Questions regarding this solicitation may be emailed to the CIF/ECI Program Executive using the subject line *ECI Solicitation Question*. Responses to Frequently Asked Questions (FAQs) will be regularly posted to the ECI Teams site [here](#). The FY23 ECI solicitation will also be posted to this site.

A Proposer's Virtual Briefing will be held via Microsoft Teams on March 25, 2022, from 12-2PM ET. The briefing will provide an introduction to the ECI Program, followed by a question-and-answer session. Additional abbreviated Q&A sessions will occur via Teams on April 21, May 19, and June 14, from 1:00-2:00PM ET. Meeting links will be provided to the Center Chief Technologists for distribution.

Point of Contact:

Michael LaPointe, PhD
NASA STMD CIF/ECI Program Executive
Email: michael.r.lapointe@nasa.gov

Appendix A: NASA Taxonomy Areas






The NASA Technology Taxonomy provides a structure for articulating the technology development disciplines needed to enable NASA aerospace missions. The 2020 revision is comprised of 17 distinct technical discipline-based taxonomies (TX) that provide a breakdown structure for each technology area:



Additional details are located at: <https://www.nasa.gov/offices/oct/taxonomy/index.html>

Appendix B: STMD Strategic Framework

The Space Technology Mission Directorate (STMD) has developed a strategic framework that outlines emergent high priority capability areas and associated technology gaps. The strategic framework is shown below; additional definition regarding specific technology gaps to be addressed within this framework is currently ongoing and will be included [here](#) once approved. All proposers are strongly encouraged to discuss their planned technology submission with the appropriate NASA STMD or other Mission Directorate subject matter experts to ensure alignment with NASA goals and objectives.

Lead	Thrusts	Outcomes	Primary Capabilities
 <p>Ensuring American global leadership in Space Technology</p> <ul style="list-style-type: none"> Advance US space technology innovation and competitiveness in a global context Encourage technology driven economic growth with an emphasis on the expanding space economy Inspire and develop a diverse and powerful US aerospace technology community 	 <p>Go Rapid, Safe, and Efficient Space Transportation</p>	<ul style="list-style-type: none"> Develop nuclear technologies enabling fast in-space transits. Develop cryogenic storage, transport, and fluid management technologies for surface and in-space applications. Develop advanced propulsion technologies that enable future science/exploration missions. 	<ul style="list-style-type: none"> Nuclear Systems Cryogenic Fluid Management Advanced Propulsion
	 <p>Land Expanded Access to Diverse Surface Destinations</p>	<ul style="list-style-type: none"> Enable Lunar/Mars global access with ~20t payloads to support human missions. Enable science missions entering/transiting planetary atmospheres and landing on planetary bodies. Develop technologies to land payloads within 50 meters accuracy and avoid landing hazards. 	<ul style="list-style-type: none"> Entry, Descent, Landing, & Precision Landing
	 <p>Live Sustainable Living and Working Farther from Earth</p>	<ul style="list-style-type: none"> Develop exploration technologies and enable a vibrant space economy with supporting utilities and commodities Sustainable power sources and other surface utilities to enable continuous lunar and Mars surface operations. Scalable ISRU production/utilization capabilities including sustainable commodities on the lunar & Mars surface. Technologies that enable surviving the extreme lunar and Mars environments. Autonomous excavation, construction & outfitting capabilities targeting landing pads/structures/habitable buildings utilizing in situ resources. Enable long duration human exploration missions with Advanced Habitation System technologies. 	<ul style="list-style-type: none"> Advanced Power In-Situ Resource Utilization Advanced Thermal Advanced Materials, Structures, & Construction Advanced Habitation Systems
	 <p>Explore Transformative Missions and Discoveries</p>	<ul style="list-style-type: none"> Develop next generation high performance computing, communications, and navigation. Develop advanced robotics and spacecraft autonomy technologies to enable and augment science/exploration missions. Develop technologies supporting emerging space industries including: Satellite Servicing & Assembly, In Space/Surface Manufacturing, and Small Spacecraft technologies. Develop vehicle platform technologies supporting new discoveries. Develop transformative technologies that enable future NASA or commercial missions and discoveries 	<ul style="list-style-type: none"> Advanced Avionics Systems Advanced Communications & Navigation Advanced Robotics Autonomous Systems Satellite Servicing & Assembly Advanced Manufacturing Small Spacecraft Rendezvous, Proximity Operations & Capture

STMD Technical Points of Contact:

STMD Principal Technologists and System Capability Leads are available for consultation with proposers regarding the state-of-the-art, on-going activities and investments, and strategic needs in their respective areas of expertise. Proposers are strongly encouraged to consult with the appropriate PT or SCLT early in the proposal process.

STMD POC	Technology Area	NASA Email
Danette Allen	Autonomous Systems	danette.allen@nasa.gov
Jim Broyan	ECLSS ¹	james.l.broyan@nasa.gov
John Carson	EDL Precision Landing; HPSC ²	john.m.carson@nasa.gov
Scott Cryan	Rendezvous & Capture	scott.p.cryan@nasa.gov
John Dankanich	In Space Transportation; CFM ³	john.dankanich@nasa.gov
Terry Fong	Autonomous Systems	terry.fong@nasa.gov
Mark Hilburger	Structures/Materials	mark.w.hilburger@nasa.gov
Kristen John	Dust Mitigation	kristen.k.john@nasa.gov
Julie Kleinhenz	In Situ Resource Utilization	julie.e.kleinhenz@nasa.gov

Angela Krenn	Thermal Technologies	angela.g.krenn@nasa.gov
Ron Litchford	Propulsion Systems	ron.litchford@nasa.gov
Joshua Mehling	Robotics	joshua.s.mehling@nasa.gov
Jason Mitchell	Communications & Navigation	jason.w.mitchell@nasa.gov
Michelle Munk	Entry, Descent and Landing (EDL)	michelle.m.munk@nasa.gov
Bo Naasz	Rendezvous & Capture	bo.j.naasz@nasa.gov
Denise Podolski	Sensors/Radiation/Comm.	denise.a.podolski@nasa.gov
Wes Powell	Avionics/Communications	wesley.a.powell@nasa.gov
Jerry Sanders	In Situ Resource Utilization	gerald.b.sanders@nasa.gov
John Scott	Space Power & Energy Storage	john.h.scott@nasa.gov
John Vickers	Advanced Manufacturing	john.h.vickers@nasa.gov
Mike Wright	Entry, Descent and Landing (EDL)	michael.j.wright@nasa.gov

- 1) ECLSS: Environmental Control and Life Support Systems
- 2) HPSC: High Performance Spacecraft Computing
- 3) CFM: Cryogenic Fluid Management

An updated list of STMD points of contact is provided [here](#). Please note that your Center Chief Technologist may be able to provide additional technical points of contact for your proposed technology area.

Appendix C. Climate Related Technology

In recognition of NASA's leadership in developing advanced technologies for the benefit of all, proposals related to advancing national capabilities in the following climate-related technology areas will also be considered:

- Clean Energy and Emissions Mitigation Technologies: Clean energy and emissions mitigation technology projects focusing on the research and development, demonstration, or deployment of systems, processes, best practices, and sources that reduce the amount of greenhouse gas emitted to, or concentrated in, the atmosphere.
- U.S. Climate Change Research Program: Earth-observing capabilities to support breakthrough science and National efforts to address climate change.

Specific topic areas could include:

- Reductions in greenhouse gas emissions (including CO₂, CH₄, N₂O, HFCs)
 - Fuel Cells
 - Batteries and Energy Storage
 - Carbon Capture, Utilization, and Storage
 - Processes that enhance industrial efficiency and reduce emissions
 - Production of clean energy including solar, hydrogen, nuclear, or other clean energy sources
- Sustainable Aviation
 - Non-Energy Emissions Mitigation
 - Vehicle Technologies and Efficiency
- Enabling platforms and early-stage instruments for climate-relevant science observations
- Harnessing data for improved visualization and ultimately climate adaptation decision support

Points of contact for additional information are listed below:

- Clean energy: John Scott (john.h.scott@nasa.gov)
- Nuclear systems: Anthony Calomino (anthony.m.calomino@nasa.gov)
- Hydrogen: Jerry Sanders (gerald.b.sanders@nasa.gov)
- Earth-observing capabilities: Mike Seablom (SMD) (michael.s.seablom@nasa.gov), Chris Baker (christopher.e.baker@nasa.gov), Justin Treptow (justin.treptow@nasa.gov)
- Carbon capture and utilization: James Broyan (james.l.broyan@nasa.gov)
- Harnessing data for improved visualization: Lawrence Friedl (SMD) (lfriedl@nasa.gov)
- Sustainable aviation: Cheryl Quinn (ARMD) (cheryl.m.quinn@nasa.gov)

Additional guidance for submitting to these areas is currently in development and will be included [here](#) once available.

Appendix D: Proposal Overview Chart

An Overview Chart must be included with the proposal. Please use landscape formatting with a legible font size. The chart should be oriented vertically (rotated 90 degrees) to fill a standard 8.5" x 11" page. The chart should not include sensitive or confidential information.

The chart should include the following information:

Project Title Principal Investigator/Center																	
Project Overview <ul style="list-style-type: none">State the challenge or gap addressed by the projectState how the proposed technology addresses this needState the benefit to NASA at the end of the 2-year project	Technical Approach <ul style="list-style-type: none">State the key tasks and milestones to be accomplished during the project	Management and Resources <ul style="list-style-type: none">State the management approach to be used for the project Summarize the requested project resources: <table border="1"><thead><tr><th></th><th>Year 1</th><th>Year 2</th></tr></thead><tbody><tr><td>CS Labor (FTE; \$)</td><td></td><td></td></tr><tr><td>WYE Labor (WYE; \$)</td><td></td><td></td></tr><tr><td>Procurement (\$)*</td><td></td><td></td></tr><tr><td>Travel (\$)</td><td></td><td></td></tr></tbody></table> <small>* Includes material, equipment, partner organization costs, other procurements</small>		Year 1	Year 2	CS Labor (FTE; \$)			WYE Labor (WYE; \$)			Procurement (\$)*			Travel (\$)		
	Year 1		Year 2														
CS Labor (FTE; \$)																	
WYE Labor (WYE; \$)																	
Procurement (\$)*																	
Travel (\$)																	
Team Members <ul style="list-style-type: none">List the team members, their project roles, and time commitmentsList the partner organization(s) and their role on the project	<div>Include a high resolution graphic illustrating the proposed technology</div>																

While the chart format does not have to match this format exactly, please incorporate the major chart elements in the quadrants shown. The chart should serve as a stand-alone introduction to the key aspects of your proposal. The Overview Chart will be included in the review package for the Source Selection Official.

Appendix E: Budget Template

Constant FY Dollars (\$)	FY23	FY24
Civil Service Labor FTEs		
On-Site Contractor WYEs (Direct)		
On-Site Contractor WYEs (Service Pool)		
Civil Service Labor/Benefits		
Civil Service Travel		
Direct Procurements		
On-Site Contractor Labor		
Materials		
Equipment		
Contracts		
Grants		
Misc. Other Direct Costs (ODC)		
Center Assessments		
Training		
Other		
Service Pool Cost (if applicable)		
Center Management & Operations (if applicable)		
Total Cost		

In a separate text section, please include a justification for each of the applicable budget elements listed above.